A CONTRIBUTION TO THE KNOWLEDGE OF THE EXTINCT AVIFAUNA OF AUSTRALIA.

In April, 1902, about two hundred small bones, few of them perfect, were received for identification by the writer from Professor Gregory. They had been collected at several stations during the Professor's geological examination of deposits around Lake Eyre, and by him were determined to be of Pliocene or Early Pleistocene age. It is of no little interest to learn that they were associated with the dingo, but not with man. Their general aspect and state of mineralisation are extremely like those of bones of birds from the Darling Downs. That they are of the same age as the latter is certified by the occurrence among them of species found in the Queensland locality, where neither dog nor man has yet been found.

The attempt to draw attention to them now made has been delayed partly by an inspired hope that additional material would be forthcoming, and that some of the conclusions now resting upon meagre evidence would be thereby modified. In the absence of this means of correction, the writer submits the best account of the relics which he is able to render.

Naturally, it will be to many a source of dissatisfaction that they can gain from such descriptions of bones little definite information beyond the fact that there once existed such and such hawks, ducks, pigeons, etc., all different from the species now living. Apart from the general resemblance in form, plumage, colours, habits, etc., to living birds of the same families or genera which the extinct ones, no doubt, possessed, we are altogether unable to learn or conceive anything respecting them. We should be very glad to know how the colours, black and white, were disposed on the old time Wonga Wonga and whether its flesh were as dainty as that of its descendant. We should also like to portray the noble Swan that once breasted the waters of Lake Eyre, but these and such like gratifications are among those that in the nature of things can never be ours. We must be content to simply specify the birds we meet, hoping that we may thus help future inquirers, furnished with increased knowledge, to trace out the relations of the avifauna with its predecessor and with the present one.

The number of bird bones in the present collection retaining characters which enable one to identify them is one hundred and eight. There are, besides, ninety undeterminable fragments derived from birds, marsupials, and reptiles (*Chelonians*).

SUB-CLASS, CARINATÆ.

FAMILY, FALCONIDÆ.

TAPHAETUS de Vis.

T. lacertosus n.s.

HUMERUS.—The distal end of a right humerus Pl. I., fig. 1. Though the size of a bird bone is not in itself any indication of its affinities, there are limits within which it is a useful guide to them. In the present instance we may give it due consideration. There are but few carinate birds in Australia which have a humerus over 25 mm. in breadth at the distal end. All told they are the pelican, swan, crane, jabiru, bustard, eagle (wedge-tailed), and sea eagles. To one or other of the families represented by these birds a fossil humerus 31 mm. in breadth may be safely referred, until it can be shown to belong to a bird now foreign to Australia. For the purpose of ascertaining to which of the families the fossil belonged, it is only necessary to glance at its leading features. Its proportions alone are nearly able to decide the question, the length of the joint measured from the level of the ectepicondylar process (*a*) is much less than its breadth across the condyles; the probrachial or brachialis inferior area (*b*) is a cavity deeply sunken between the edges of the shaft; the popliteal fossa (*c*) is also, but less deeply, excavated; the ectepicondyle is tumid laterally, its process short but acute; the entepicondyle (*d*) is only so far oblique as to be directly continuous with the edge of the shaft; the ulnar condyle (*e*) bears across it, well but not sharply defined, the oblique ridge (*f*), so frequent in birds, and, in this instance, forming with the oblique edge of the non-articular part of the condyle a V shaped ridge; the condyles are narrow; the radial extends proximad only to three-fifths of the length of the joint; on the postaxial side of the bone the extensor sulci (*g*) are remarkably broad and deep; the olecranal fossa (*h*) is deep and well defined.

With this bone the humerus in *Pelecanus* is irreconcilable, on account of the exceptional fore-and-aft thickness of the entepicondyle in the latter, the comparative shallowness and indefiniteness of its olecranal fossa, and the great length of its condyles, of which the radial extends proximad nearly to the level of the place of the ectepicondylar process were that developed. The part of the humerus in the Swan corresponding to the fossil differs from it in its small probrachial area, its shallow popliteal fossa, and the extension of its relatively large radial condyle beyond the end of the epicondyle, which again is devoid of a process. No sign of relationship with the fossil is yielded by the Australian bustard, which has, moreover, the radial condyle large and reaching nearly to the level of the epicondylar end, the olecranal fossa small, and the probrachial area superficial and partially ribbed. Nearly on the same grounds, with the addition of an ectepicondyle without a process, the bones in the Crane and in the Jabiru are incomparable with the fossil. In birds of the remaining family, the *Falconidæ*, the bone has so much in common with the fossil humerus that no doubt as to the affinity of the latter can exist. Compared with *Haliaetus leucocephalus*, it agrees in the relative shortness of its joint, proportions of its condyles, depth of its olecranal fossa, and development of its epicondylar process. But its differences from *Haliaetus* are strikingly great; from *Uroaetus* still greater. These have the probrachial area superficial, the popliteal fossa shallow, the extensor sulci faint. Everything in the structure of the fossil conspires with the boldness of its sculpture to lead to the conclusion that it was part of an eagle not much larger than *H. leucogaster*, but of enormously greater power of flight, and when one recollects that the sea eagle can as it flies gorge on a full-grown black duck, the weight of the prey which this extinct eagle could devour on the wing may be imagined. Locality, Kalamurina.

QUADRATE.—Plate I., fig. 2.—Except for the loss of the orbital process (*a*), this is an entire and well-preserved bone from the right side. The presence of a deep circular pit (*b*) in the fore end of the base of the bone, for the reception of the quadratojugal, taken in conjunction with a large pneumatic foramen (*c*) on its posterior side below its distal articulating surface for the squamosal, and the breaking up of the posterior part of its mandibular articulating surface into two distinct facets, determines its relationship to the eagles. *H. leucogaster* has the quadratojugal pit and the foramen, and its ventral surface does not, as in many birds, afford to the mandible a continuous surface of articulation. Since, in this eagle, the length of the bone measured from the outer end of its squamosal articulation (*d*), to the point of junction with the pterygoid (*e*) is 20 mm., and in the fossil 22 mm., the latter represents a bird about as much larger than *H. leucogaster*, as the humerus gave us reason to expect. There does not, indeed, seem to be any reason why the fossil should not be attributed to *Taphaetus*, provisionally at least; and if this be admitted, the quadrate, one of the most characteristic of bones, amply affirms the justness of proposing for it generic distinction from other Australian birds of prey. Its squamosal surface, apart from minor points of difference, is on the whole similar to that of *H. leucogaster*. The foramen (*c*) distad of this is not, as in *Haliaetus*, divided by a deep septum, but is one large opening nearly one-third of the length of the bone, the quadratojugal pit is very wide and deep, more than 3.5 mm. in diameter, the mandibular surface is divided by a broad and deep sulcus (*f*) into anterior and posterior regions, the anterior bearing on its lower face a quadrangular facet (*g*), which extends to the quadratojugal pit; the posterior is subdivided into three facets, two diversely declining from each corner—namely, a larger one on the outer side (*i*), and a smaller one facing inwards on the inner side of the end for the pterygoid (*k*), and a smaller one (*l*), posterior to the others ; the middle of the outer ventral edge of the bone (*m*), which, in *Haliaetus*, is expanded in order to increase the articulating surface, performs the same service in the fossil, but is very much thicker and more protuberant. The owner of this quadrate was as strong in the beak as on the wing. Locality, Kalamurina.

In the proceedings of the Linnæan Society of New South Wales, Vol. 6, at p. 123, is a note proposing that the Eagle described in the Proceedings of the Royal Society of Queensland, Vol. 6, p. 161, under the name *Uroaetus brachialis* should be removed to a new genus, *Taphaetus*, on the ground that an aquiline femur figured and described in the note, and assumed to be cospecific with the humerus, *U. brachialis*, could not belong to the living genus, *Uroaetus*. This proposal is largely based on the improbability of two large eagles co-existing in the same fauna and locality. Now that we have proof that two birds of the kind were contemporary, it seems advisable to restore *brachialis* to *Uroaetus*, the genus to which its humerus allies it. In placing the humerus and quadrate now described in the same genus as the femur of the note, the writer is led by a desire to avoid multiplication of names on insufficient grounds. The femur is 7½ mm. shorter than that of a female of *Uroaetus audax*, but this measurement is estimated after a conjectural restoration of the condylar region, and may be somewhat defective. The humerus, on the other hand, is decidedly larger than that of *Uroaetus audax*. We must therefore either propose a new genus for the latter fossil, or regard *Taphaetus* as a rather short-legged eagle, a course which for the present seems preferable.

Asturaetus n.g.

Asturaetus furcillatus n.s.

Tibiotarsus.—Plate I., fig. 3.—A right *tibiotarsus*, wanting the cnemial crest, but otherwise well-preserved. A cnemial crest produced but slightly, if at all, proximad of the articular surface of the head, a fibula anchylosed to the shaft at its distal end as well as to the peroneal ridge, and a broad low distal joint with low ridged malleoli, of which the inner on the post axial side inclines ventrad at a much more acute angle than the outer,—these features combined afford good guidance to the tibias of the Australian *Falconidæ*, exclusive of *Pandion*. But to discriminate between the tibias of the genera wherein the bones are nearly the same in size and porportions—namely, *Haliastur*, *Astur* and *Lophoictinea*—is no easy matter, for these are all very much alike. Happily, it is not necessary to attempt to do so now, since the tibia of the extinct falconine bird named in the title is sufficiently distinguished from all of them by characters of its own, observable on its almost perfectly preserved distal end. Immediately proximad of the outer malleolus, the edge of the shaft is dilated, and is slightly curved forward, with the result that a distinct, though shallow, groove (*a*) is formed between it and the bridge for the extensor tendon; the opposite edge of the bone is somewhat dilated in the recent genera, but in the fossil to a greater extent, and a deep groove (*b*) is formed between it and the foot of the extensor bridge. This edge is continuous with the sharp ridge-like edge of the shaft which descends from the inner anterior crest (*c*), the inner limit, I presume, of the flexor perforans muscle. The most peculiar feature of this tibia is the structure of the extensor bridge. This is Y shaped, the fork of the Y arching widely over the inlet orifice, and its stem separating two outlets (*d* and *e*), one at the proximal end of each malleolus. It would seem from this that the extensor tendon divided beneath the osseous loop, a circumstance I have not before met with. Whether this is an abnormality in the species or a constant character in the genus, time alone will show. As to the relations of the bird we might, judging by its proportions, affiliate it to *Astur*. It has exactly the same thickness of shaft as in *A. novæhollandiæ*, but it is 5 mm. longer. But in structure it approaches more nearly to *Nisaetus*, which has a similarly wide and deep extensor sulcus, a dilatation of the shaft near the inner malleolus, and a flexor perforans ridge on that edge of the bone. The hawk seems therefore to stand somewhere between the Goshawk and the Little Eagle. Locality, Lower Cooper. Loc. 5.

Baza gracilis n.s.

Humerus.—Plate I., fig. 4.—A very imperfect humerus from the left wing, consisting chiefly of the shaft, with remains of the condyles at the distal end. I am led to attribute this bone to a member of the *Falconidæ*, mainly by the position and extent of the pectoralis scar (*a*), and of so much of the anterior crest as still surmounts it, by the curvatures of the shaft, the status of the epicondylar tuberosities, and by the relative size of the radial condyle as is indicated by its remains. Among the hawks, with a humerus of corresponding size—that is, of the smaller kinds—*Baza subcristata* seems on the whole to have the greatest likeness to the fossil, and to have an uncommon feature, which it might well have received from the extinct bird. Pending correction by future discovery, the two may fairly be considered to be congeneric. The head of the fossil is broken off at the proximal end of the pectoral scar, which has much the same form and extent as in *B. subcristata*, but is more on the dorsal edge of the bone, and is separated by a well-marked sulcus from the base of the anterior crest. At the distal end, the ulnar condyle is, with the part adjacent, almost entirely destroyed; the radial condyle, fortunately in great part preserved, does not nearly extend to the level of the ectepicondylar tuberosity (*c*), from which, as in *Baza*, a transverse ridge is carried to the edge of the probrachialis area. This, in the fossil, is more pronounced, and on reaching the area curves suddenly proximad and vanishes. It is the feature to which reference has been made. The popliteal fossa is shallow, but the probrachialis area is deeper and more clearly defined than in the recent species; its surface is rough, but not longitudinally striated. On the postaxial surface the sulci for the extensor tendons are also deeper and better defined. The length of the fossil is 61.5 mm., the breadth of the shaft is 5.5 mm. at the narrowest, of the distal end, 14.5 mm. Locality, Lower Cooper. Loc. 6.

FAMILY COLUMBIDÆ.

Leucosarcia prœvisa n.s.

Humerus.—Proximal half of a bone of the right side minus a part of the internal and of the external tuberosities (Plate I., fig 5a). This portion of the pigeon wing is recognised at once by the shallowness of the subtrochanteric fossa (*b*), and by the short, blunt, and triangular external tuberosity (*a*). The fossil is in generic agreement with *Leucosarcia*, but represents a more delicately formed species. Its capitum is proportionately smaller, and its shaft comparatively much attenuated, but its sulcus transversus (*d*) is considerably deeper, its incisura capitis (*e*) wider, and the cribriform plate of its subtrochanteric fossa is pierced by more numerous and larger foramina. These seem to be sufficient differences to warrant specific distinction. Locality, Wurdulumankula.

ORDER LIMICOLÆ.

Ocyplanus n.g.

O. prœses n.s.

Tarsometatarsus.—Plate I., fig. 5b., represents the distal end with a part of the shaft of a right tarsometatarsus. The leading discriminative characters of this bone are, first, the absence of any trace upon the shaft of a first metatarse; second, a great inequality in the prolongation of the free ends of the metatarsals. From this combination of features it results that the great majority of the families of Australian birds are withdrawn from consideration. In brief, we are reduced by it to compare with the fossil the following only—the ducks, grebes, and certain of the *Limicolæ*. The ducks are in general agreement, but have the metatarse commonly short and strong; in no case are its proportions like those of the fossil; it is impossible to obtain the metatarsal index of the latter, but it is evident from the fragment of it preserved that the length and slenderness of the entire bone would deny its derivation from a duck.

Moreover, the vascular perforation near the end of the bone is, in the ducks, situated between the bases of the pedicels of the second and third trochleas, the bridge between the pedicels being very short, whereas the perforation is, in the fossil, at a great distance from the free ends. The same two objections apply to the grebes, but the latter of them with less force, since the perforation is in them not so far distad as in the ducks. We first meet in the *Limicolæ* with bones similarly conditioned to the fossil as to structure and proportions, but not as to size. The breadth of the fossil across the trochleas is 12.5 mm., of the shaft, 5 mm.; in the Stone Plover the former is 11.5 mm., of the shaft at the same point, 4. Burhinus approaches it then most nearly in size, but in form is quite different. The shaft of the fossil expands gradually to its greatest trochlear width; in Burhinus the trochlear expansion is sudden. There is, in fact, no genus of the *Limicolæ* known to the writer into which this metatarse can be admitted. It therefore becomes a question whether to designate it *Gen. et sp. ind.*, or to give it a name. Yielding to the persuasion that the latter course will be more convenient to students of the subject, the writer proposes for the bird the names given above.

FAMILY CICONIIDÆ.

XENORHYNCHUS nanus de Vis.

TIBIA.—The distal fifth or less of the right tibia. Unfortunately this second example of the tibia adds nothing to our information about this smaller Jabiru than that it attained a rather larger size than the tibia already described warranted us in attributing to it. In that bone the greatest width across the trochleas was 14 mm., in the present one it is 15 mm., and all the parts of the bone are proportionately larger. It is not thought at all necessary to give a figure of it. Locality, Wurdulumankula.

XENORHYNCHOPSIS n.g.

The differentiating features which seem to demand the separation of this genus from Xenorhynchus consist,—(i.), in a peculiar addition to the tuber which at the distal end of the tibia increases the articulating surface of the fossa for the reception of the intercondylar process of the tarsometatarsus. The tuber itself (Plate I., fig. 6 A, B, C) is much as in Xenorhynchus, but proximad of it rises a short thick subpyriform tubercle (fig. A. (*a*), which, as it were, forms a buttress to the base of the tuber;—(ii.) of a different form of the condylar surface viewed end on (fig. B.); that of the new genus being shorter in proportion to its breadth, and having its inner trochlea (fig. B (*a*) relatively much smaller than and more remote from the outer;—(iii.) in the scar on the outer surface of the shaft near the malleolus in Xenorhynchopsis being a long groove (fig. C (*b*) extending distad to the middle of the side of the malleolus.

Of these Jabiru-like birds, there seem to have been two species, a larger and a smaller.

XENORHYNCHOPSIS tibialis n.s.

From this species we have two examples of the distal ends of tibias of opposite sides. That from the right leg, the one figured, is from a bird as nearly as possible equal in the size of the part to an ordinary Jabiru of to-day. The left tibia is from a rather large individual, but is rather more imperfect, and has no part of the shaft attached. Locality of both examples, Lower Cooper.

XENORHYNCHOPSIS minor n.s,

TIBIA.—Distal end of a right tibia (Plate II., figs. 1 A, B). Since individuals of the present Jabiru do not vary very much in size, it would not, without reason to the contrary, be right to assume that an extinct bird of the kind did so. Necessarily, then, a bone indicating an individual only two-thirds of the dimensions of Xenorhynchopsis tibialis must be taken to represent a second species. The malleoli of the Xenorynchopsis tibialis tibia measure at their widest extent 19.5 mm., those of the present bone 13 mm. The shaft of the latter shows an even greater difference, being but 7 mm. against 10 mm. in Xenorhynchopsis tibialis. A specific character still less open to doubt is the form and extent of the lateral groove (Fig. 1 B*a*), which is relatively much shorter and more oblique. Locality, Unduwampa.

TARSOMETATARSUS.—Imperfect trochleas of the right foot (fig. 1 C). This bone, which indubitably belongs to the *Ciconiidæ* and does not belong to *Antigone*, can only be referred on account of its size to Xenorhynchus nanus or Xenorhynchopsis minor. In the shattered state of the fragments, it is impossible to place it in the latter genus with certainty, but the balance of probabilities seems to incline that way. Locality, Wurdulumankula.

FAMILY IBIDIDÆ.

IBIS (?) conditus n.s.

FEMUR.—A left femur injured in the head, neck, trochanter and both trochleas (Plate II., fig. 2 A, B).—Notwithstanding the damages the bone has suffered it retains enough character to show that it formed part of one of the *Ibididæ*, for to this family we are led by the absence of a pneumatic foramen, the presence of a moderately raised trochanter, and by its relatively stout proportions. In these it is assimilated to *Carphibis spinicollis* rather than to any other member of the family available for comparison. It is slightly shorter than in a small example of that species, but no slenderer in the shaft ; the head and neck are considerably narrower, the tubercle for the loop of the biceps cruris, present in other *Ibididæ*, appears in this species to be nearly obsolete, scarcely marked off from the outer condyle, but the median tubercle (Fig. 2 A*b*), proximad of the popliteal space, is largely developed, and is followed distad by a sharply curved line partially enclosing a low eminence, an arrangement which does not appear to occur in other Australian members of the family. The foramen beneath the neck is minute. Locality, Wurdulumankula.

This species is placed in the genus Ibis provisionally. It will probably not remain there when its structure is better known.

FAMILY ANATIDÆ.

To judge from the contents of the collection under study, Swans were among the more numerous of the birds that frequented the old lake ; next to the Cormorants they were the most numerous. Their bones are seventeen in number. There appear to have been two species—a rather dwarfish one, which can hardly be separated generically from the present black swan, and a portly one which has claims to be brought apart in a generic niche of its own. The bones which may be brought forward in support of its claim are these : the coracoid, humerus (two)—radius, and ulna of the wing ; the femur (two), tibia, and metatarsus of the leg. These it is proposed to notice under the name

ARCHÆOCYCNUS lacustris n.g. and sp.

CORACOID.—Distal half or less of the coracoid of the left side, minus the external angle of its base (Plate III., fig. 1 AB). The supracoracoideal surface (A*b*,) is separated from that external to it by a longitudinal ridge, which is much more convex and pronounced than that in the Black Swan, Chenopis, and does not bear on its summit a raised limiting line of muscular attachment. The articulating surface for the groove of the sternum is more concave, and notwithstanding that it is a little imperfect at both ends, markedly greater in both its dimensions. The oblique ridges on the visceral surface of the bone are less regular and numerous, thinner, more sharply raised and less continuous. The breadth of the shaft at its point of fracture is sensibly the same as in C. atrata. Locality, Lower Cooper.

So far as the structural characters of a coracoid allow one to judge, we may suppose this swan to have had a broader and deeper breast, itself indicating a larger body than the present one, but, perhaps, no greater power of wing.

HUMERUS.—Two distal ends, a right and a left, of this bone (Plate III., fig. 2 A and B) are distinctly those of a swan, but unluckily are not sufficiently perfect to afford us as much information as we could wish. They differ not a little in form from the recent bone, in which the entepicondyle is prolonged distad so far as to give to the distal contour of the bone an approximate squareness, which is altogether wanting in the fossil. The radial tubercle (trochlea radialis) (*c*) is comparatively small in the extinct bird, and the m. probrachialis impression is much deeper. A tubercle for the insertion of ligament (Fig. A *a*) rises proximad of the entepicondyle in P. lacustris, in the living bird the insertion is into an oval depression on the unraised surface of the bone. In size these bones do not exceed the dimensions of large examples of C. atrata. Localities, Lower Cooper and Kalamurina.

Radius.—Proximal fourth of a right radius (Plate III., fig 3). This has all the distinctive marks of a swan's radius, which can hardly be mistaken for that of any other bird of similar size. It is clearly not that of C. atrata. Its shaft is equally strong, but its articulating cup (Fig. 3B) is smaller. The shaft also differs in form, being more distinctly trihedral. Locality, Wankamaminna.

Ulna.—Plate III., fig. 4.—Distal third of a right ulna. This, in its present abraided condition, is scarcely distinguishable from that of C. atrata, and suggests nothing worthy of record.

Femur.—Plate III., fig. 5.—The proximal three-fourths of a right femur recognizable by means of its size and proportions, and by the presence of the small round foramen a short distance distad of the neck on its postaxial surface. The head and adjacent part are much corroded, and fail to yield any information. The shaft is considerably stouter than in a large C. atrata. There are remains of a well-developed pectineal tubercle. The linea aspera is a very low rugose ridge. Locality, Undwampa.

The proximal half of a left femur of similar size has on the postaxial aspect the uneven surface beneath the trochanter as well pronounced, but of a different pattern, to that of the present swan. The adductor magnus limiting ridge is in this example extant. Locality, Lower Cooper. These leg bones indicate a heavier bird than the present swan.

Tibia.—A distal half of a left tibia (Plate III., fig. 6 A b). The shaft is equal in breadth to that of a large C. atrata, but the depth across the outer condyle (Fig. B) is much less, and the two condyles are of the same length or very nearly so; the bridge over the ext. dig. communis tendon (Fig. A b.) is much narrower. In other respects the bone resembles that of Chenopis. Locality, Malkuni.

Tarsometatarsus.—Plate III., fig. 7 A, B.—A proximal end from the left foot, the same size as in a female of C. atrata. The ridge for the tendon Achillis is missing (Fig. 7A a), the other ridges (b c) separating the grooves for the deep peroneal and flexor profundus are better developed than in the recent swan. Part of the insertions of the tibialis anticus are evident in front; the articulating surface for the outer malleolus (Fig. 7B a) is somewhat more extended ventrad. Locality, Wurdulumankula.

VERTEBRA.—A moiety of a cervical vertebra, very imperfect, merely preserving the centrum and neural arch in part.

In the large and deeply locked sternocoracoideal joint, in the obliquity of the entepicondyle of the humerus, the presence of the isolated tubercle proximad of it, and the smallness of the radial condyle, in the trihedral form of the shaft of the radius and relative smallness of its head, in the absence of a definite linea aspera from the femur, and in the strength of the ridges protecting the passage of the flexors of the foot, we may, in these differences taken together, see reason to believe that these bones would be wrongly ascribed to a Chenopis.

GENUS CHENOPIS.

CHENOPIS nanus n.s.

CORACOID.—Plate II., figs. 3 A, B.—Proximal three-fourths of a left coracoid $7\frac{1}{2}$ mm. broad across the shaft. In an ordinary black swan the shaft is at the least 11 mm. in breadth. The fossil therefore represents a bird rather more than two-thirds of the size of the living species. It has all the well-known features of a swan's coracoid, and offers nothing but size as a means of discrimination. Locality, Lower Cooper.

HUMERUS.—Plate II., fig. 5.—Distal fifth of a right humerus, $22\frac{1}{2}$ mm. in its greatest breadth, against 26 mm. in the smallest humerus of C. atrata available. The ulnar tubercle (trochlea ulnaris) (fig. a.), and the radial (trochlea radialis) (fig. b.) are both relatively small, the ectepicondyle is at its proximal end much less prominent, the probrachialis impression (fig. c), more contracted and deeper. Most of the postaxial surface of this bone is lost. Locality, Lower Cooper.

TIBIA.—Plate II., fig. 6.—Distal fourth of a left tibia about 2 mm. narrower at the joint than the least breadth in the Black Swan, but as much broader in the shaft at its point of fracture. The bridge over the extensor tendon is broader than in C. atrata. Locality, Lower Cooper.

TARSOMETATARSUS.—Plate II., fig. 7.—Distal half of the bone of the left foot, the trochleas very imperfect. The osseous bridge between the third and fourth metatarsals in place; the shaft wider by 1 mm. at its point of fracture than in C. atrata. From this measurement and from the presence of a line of junction on the shaft between the third and fourth metatarsals, it seems quite possible that this bone may be from a young *Archæocycnus lacustris*. Locality, Malkuni.

Distal half from the left foot; no bridge between the third and fourth metatarsals; line of junction between these metatarsals not obliterated; breadth of shaft 7½ mm. Locality, Wurdulumankula.

Pelvis.—Plate II., fig. 4.—Mesial part of the axis of a pelvis comprising the ischiadic, sacral, and many of the postsacral vertebræ, too imperfect to yield any characters of specific value. Locality, Unduwumpa.

Biziura exhumata de Vis.

Humerus.—Plate IV., figs. 1 A, B.—Proximal half of left humerus. Compared with the humerus of B. lobata, the following differences are manifest: The bone is larger, but not greatly so; the incisura capitis (fig. B,a.) is narrower, the capitum (figs. A and B b.) is more globular, the notch between it and the tuberculum externum (fig. A,c.) deeper; the crista superior (figs. A. and B,d.) is stronger and higher; the pneumatic foramen larger, and its lip (proximad) more arched; the shaft is 1 mm. broader, but is not thicker. Locality, Malkuni.

Tibia.—Plate IV., fig. 2.—Distal half of a right tibia. The only prominent feature differentiating this from the corresponding part in B. lobata is the comparative shortness of its intercondylar sulcus; were it from the opposite side, it would make a perfect joint with the tarsometatarsus of the bird from the Darling Downs, elsewhere described. Locality, (?)

Pelvis.—Plate IV., fig. 3.—A large part of the preacetabular region of a pelvis forward from the fore edge of the right acetabulum, but without the iliac fovea. The vertebral hypapophyses form a deep keel, having its edge undulated, but not interrupted or pierced with foramina; length from edge of acetabulum 47.5 mm. Locality, East of Pirani.

It is curious that the musk duck, now one of the most solitary of the whole tribe, should be found associated with so many other waterbirds, both in South Australia and Queensland. One is tempted to think that the habit of isolation, so marked in the living species, is a symptom of generic decay, a decay which our occupation of its haunts will rapidly turn into extinction.

Anas gracilipes n.s.

Coracoid.—Plate IV., fig. 4 A, B.—A fairly well preserved left coracoid, 38 mm. in length, similar in size and proportions to that of Anas (Nettium) castanea, from which it differs in the following points: The acromial process (fig. 4a.) is much slenderer; the humeral facet or glenoid cavity is concave dorsad, but convex ventrad; the scapular facet is deep and cuplike; the visceral surface of the base of the shaft is traversed by two oblique ridges, which are continuous (fig. 4c); the articulating surface for the sternum is but slightly reverted at its inner end fig. 4b.). Locality, Lower Cooper.

TARSOMETATARSUS.—Plate IV., fig. 5 A, B.—A bone of the right foot, 35 mm. in length. This is somewhat (1 mm.) shorter than the smallest corresponding bone of Anas punctata with which it may be compared. Though evidently related, the two bones differ much. The shaft of the fossil is broader in the middle than the other, and consequently its edges are more nearly parallel one to the other. Its trochleas are narrower and longer; the third (fig. 4a.) is produced beyond the fourth; the second rises from the shaft in a long ridge proximad. The longitudinal ridges on both aspects of the shaft are very prominent, indicating much more capacity for an active employment of the foot than is given to the living bird. Locality, Kalamurina.

ANAS (NETTIUM) strenua n.s.

HUMERUS.—Proximal four-fifths or somewhat less of a left humerus (Plate IV., fig. 6). As this bone approaches in form most nearly to that of the Teals among recent ducks, it may be consigned temporarily to the genus *Nettium*. In dimensions it agrees with the humerus of the Shoveller, Spatula rhynchotis, but from this it diverges in the direction of the Teals in its relatively small capitum and in the shape of its pneumatic foramen, whose opening is less rotund and more lenticular. Length, 62 mm.; breadth across the proximal end, 18 mm. Locality, Patteramordu.

Distal third or less of a left humerus, which may possibly have belonged to the preceding. This part of the bone is also in agreement as to size with the part in Spatula rhynchotis, but is at once differentiated from it by the inferior size of its trochleas, especially that of the radial (Plate IV., fig. 7a.), and by the depth and length of the sulcus between the trochlea and the adjacent epicondyle (b). Locality, Patteramordu.

NYROCA effodiata n.s.

HUMERUS.—Plate IV., fig. 8.—Extreme distal end of the right humerus of a duck of small size. Though more nearly approaching to the hardhead (Nyroca) than to any other living duck, the propriety of adding it to that genus is doubtful, not so much on account of inferiority in size, and consequently great inferiority in that respect to its contemporary N. robusta, but because of a somewhat different shape of the bone on its ulnar extremity. This is more produced distad in N. australis, the ulnar condyle and its epicondyle forming an oblique instead of a right angle with the long axis of the shaft. The probrachial impression, of which part is preserved, extends distad beyond the proximal end of the radial condyle, and it is separated from the tendon facet distad of it by a narrow and rather high ridge (a), the tendon facet itself is concave, as in N. robusta, not flat as in the living Nyroca. The greatest breadth of the fossil across the condyles is 11.25 mm., against 12.75 in N. australis. Locality, Wurdulumankula.

Nettapus eyrensis n.s.

Humerus.—Plate IV., fig 9.—Distal third of right humerus. The first evidence of the antiquity of the Pygmy Geese which has occurred to me. It is but a small fragment, but it retains enough character to shew its affinity with the genus and distinctness from the living kinds pulchellus and albipennis. It may be recognised by the form and direction of the probrachialis impression (a), which in the living birds is broad and inclined but little from the longitudinal axis of the bone, this in the fossil is a long narrow tract much inclined to that axis. Between the distal ends of the tract and the radial condyle is a distinct smooth transverse concavity (b), which, in the recent bone, is not found, and beyond the end of the tract on the entepicondyle is a round scar (d) for insertion of ligament, replaced in recent bones by an imperfectly flat surface. The old pygmy goose appears to have been of the same size as *Nettapus albipennis*. Locality, Lower Cooper.

Coracoid.—Plate IV., fig. 10.—Fragment of upper end and part of shaft of a right coracoid of a *Nettapus*, which accords in size with the humerus above described. With the exception of the tip of the acromoidial process, the bone, so far as it goes, is fairly entire. Locality, Lower Cooper.

FAMILY STEGANOPODES.

Pelecanus grandiceps n.s.

Quadrate.—Except for the loss of the orbital process, a fairly well preserved bone of the left side (Plate V., fig. 1 A, B). This must have been derived from a distinctly larger bird than the present *P. conspicillatus*. At its base along the mandibular articulation, it measures 26.5 mm., the quadrate of the living bird only 22mm. Its height from the anterior end of the base to the end of the surface for the squamosal, is 36 mm. against 30.5 mm. in *P. conspicillatus.* The head of this fossil pelican was therefore one-fifth longer than that of the present one. It would probably be about 21 inches in length (534 mm.) Structurally, it of course much resembles the quadrate of a modern representative of the genus, but there are peculiarities about it which may be thought to shew that it is not identical with any of them. The surface of the bone is thrown into much deeper tracts and higher ridges. The cavity for the pterygoid articulation (c) is on its inferior margin scarcely delimited, the ridge of the orbital process (d) failing to descend upon the anterior end of the mandibular process, and so separate the cavity from the outer surface. The foramen at the middle of the base of the orbital process externally is comparatively very small; the squamosal articulation very broad. On the hinder surface of the bone, a little below the squamosal process, low ridges, which proceed from each end of that process, meet and form together a descending ridge. Locality, Lower Cooper.

Coracoid.—Plate V., fig. 2.—A fragment of a left coracoid exhibiting a great part of the precoracoid process, with the foramen for the supracoracoideus nerve, evidently from a large pelican, but too scanty to supply further information. Locality, Lower Cooper.

Tarsometatarsus.—Plate V., fig. 3.—Part of the distal end of a left tarsometarsus, shewing the third and most of the fourth trochleas. The third trochlea is 19 mm. long, in *P. conspicillatus* it is at the most 17 mm. It seems to have been of nearly the same form from its proximal end, where, between the rotular prominences, it commences in a shallow, but distinct cavity. Locality, Lower Cooper.

Pelecanus proavus de Vis.

Femur.—The distal end of a right femur entire on the trochlear aspect, imperfect on the preaxial (Plate V., fig. 4); in general configuration premonitory of modern pelicans, in size, 29 mm. across the trochleas against 30.5 mm. in an average example of *P. conspicillatus*. It is in the inferior size of the trochleas that the most striking difference presents itself; in *P. conspicillatus* the longitudinal extent of the ulnar is 21.5 mm., of the radial 16.5; in the fossil the ulnar is 18, the radial 14.5. There is also a large difference in the condition of the ectepicondylar region; in the extinct bird it is comparatively narrow and rather deeply sunken between the trochlea and the ectepicondylar edge, the cavity formed extending distad nearly two-thirds of the length of the trochlea (fig. A,a). In the living pelican the surface is convex to near the proximal fourth of the trochlea, where a comparatively small cavity is situated. Locality, Lower Cooper.

Tibia.—Distal end of a right tibia (Plate V., fig. 5). With the exception that the bridge over the ext. dig. com. tendon has never been completed, there is nothing in this fragment to distinguish it from a corresponding fragment from the extinct pelican. Locality, Lower Cooper.

Plotus laticeps n.s.

Cranium.—Short of all accessories (Plate VI., fig. 1). Compared with the cranium of *P. novæhollandiæ*, the following measurements are significant of specific difference :—

	Fossil.	P novæhollandiæ
Total length from occiput to frontonasal suture ..	49·5 mm.	48·0 mm
Greatest breadth	24·5 ,,	23·0 ,,
Breadth of frontonasal joint	11·0 ,,	8·5 ,,
Breadth of basioccipital	8 5 ,,	7·0 ,,
Length of basioccipital	11·0 ,,	10·5 ,,

Apart from these varying proportions, there does not seem to be more than one remarkable difference between the extinct and living Darters. The interorbital depression of the frontals is in the fossil a well-marked groove extending caudad beyond the middle of the cranium. Also the presphenoid rostrum is higher and much stronger than it is in the recent bird. (Plate VI., fig. 1a).

As this cranium is in all its dimensions somewhat larger than that of *P. novæhollandiæ*, it prohibits us referring it to the small species previously described *P. parvus*. Locality, Lower Cooper.

Pelvis.—Plate VI., fig. 2A, B.—This is from the pelvis of a Plotus, but it is quite uncertain whether it came from the species abovenamed or from *P. parvus*, or from any other species. The only thing that can be said on the point is that it is not from a pelvis of *P. novæhollandiæ*. As will be seen from the figure, the fossil is little more than the præacetabular vertebræ, with remains of the interacetabular part of the ileum, and deprived of its hypapophysial foramina. Locality, Lower Cooper.

Phalacrocorax gregorii n.s.

Premaxillary.—Plate V., figs. 6 A, B.—Entire from tip to the nasofrontal suture. Its length to the nasofrontal joint is 80 mm., its width at the joint, 17 mm. The nearest approach to this mandible is found in *P. carbo*. which has a length of 68 mm., with the same width of 17 mm. There is nothing in the fossil to prove its specific distinction from *P. carbo*, except that it is longer in proportion to its breadth, and this, in the bill of such a bird, is an insufficient trait. Its non-identity with the living cormorant of southern waters depends on that of the numerous bones associated with it. Locality, (?). Collected by H. Y. L. Brown, Esq., Government Geologist.

Coracoid.—Plate VII., fig. 1 A, B.—Proximal half of right coracoid, minus the summit of the acromium. This is in size about the same as in *P. carbo*, but conspicuously differs from the recent bone in the size and form of the facets for the humerus and the scapula, the last especially. This is a deep cup-shaped cavity, occupying the whole of the articular surface of the precoracoid process. The pad for the head of the humerus is quite differently proportioned, being much broader, though not greatly longer, than in *P. carbo*. In the recent bone there is an inframarginal groove from the proximal end of the humeral pad to the tip of the acromium on its outer surface, this in the fossil is a low ridge running proximad further from the edge. The shaft just below the scapular articulation (Fig. A,d.) is thicker and flatter than in recent Cormorants. Locality, Wankameminna.

To this proximal half may probably be added a distal two-thirds of the same side largely defective at its outer angle and rather slenderer in the shaft (fig. B.) Its generic status is made known by the extent to which the inner edge of the base overlaps the edge of the sternum when it is in place, but the transverse extent of the overlapping is apparently shorter than in living Cormorants, as short, indeed, as in Plotus. Locality, Lower Cooper.

HUMERUS.—Plate VII., fig. 2 A, B.—Proximal two-fifths of a left humerus, fairly well preserved, its worst injury being the loss of the proximal border of the pneumatic foramen. The bone is, on the whole, very similar to that of *P. carbo*, but the following differences are observable: The capitum is shorter, and is more distinctly marked out by greater depth in the incisura capitis on the one side (fig. B a.), and in the space ventrad of the tuberculum externum (fig. B b.) on the other. The whole of the bone is narrower in proportion to its length. Locality, Malkuni.

Distal four-fifths of a right humerus, in good preservation, of the same length as in *P. carbo*, but with a slenderer shaft. The probrachialis scar (Plate VII., fig. 3 B a.), which in *P. carbo* is interrupted in the middle, is in this continuous or nearly so; the proximal end of the ulnar condyle (fig. B b.) is more deeply incised on its ventral side, and the proximal edge of the incision is sharp; the entepicondyle (c.) is shorter and more tumid, the ridges on the postaxial surface (A a.) are sharper, the grooves between them broader and deeper. Locality, Kalamurina.

Distal two-thirds of a right humerus, fairly well preserved, In this the probrachialis scar is continuous. In other respects, it is similar to the preceding. Locality, Lower Cooper.

Distal half of a right humerus, scar continuous, postaxial surface of joint abraded, otherwise as before. Locality as preceding.

Shaft of a right humerus. Locality, Malkuni.

Distal fourth of a left humerus, well preserved. Locality as last.

Distal fourth of a left humerus, also well preserved. Locality, Lower Cooper.

CARPOMETACARPAL.—Entire length of a carpometacarpal of the right side, somewhat longer (by 2 mm.) and slenderer than that of *P. carbo*. The rotular groove of the proximal articulation is narrower and the cavity at the anterior side of the conical process on its ventral aspect is broader and deeper. There are numerous points of difference in the sculpture of the two bones, but these cannot be explained without dwelling to an unjustifiable extent on minute detail; some of them are apparent in the drawing (Plate VII., fig. 4). Locality, Lower Cooper.

Fragment from the preaxial side of the carpometacarpal joint, consisting of the carpal process for the pollex metacarpal, and part of the rotular groove. This conveys no further information. Locality, Malkuni.

FEMUR.—A left femur, nearly entire; shorter by 3 mm. than a *P. carbo* femur, and with narrower ends, it is yet of the same measurement in the shaft. Were it not for this difference in proportions, I should not hesitate to attribute the bone to *P. carbo,* so close is the resemblance between them. Locality, Wurdumankula.

A left femur of the same length, but rather slenderer and imperfect at both ends, in no important point differing from the preceding. Locality, the same.

Proximal half of a left femur, capitum imperfect, in this the neck is shorter and the capitum larger than in *P. carbo,* there is also a difference in the sculpture of the bone on the outer surface behind the trochanter ; besides the depressions seen in *P. carbo,* there is a large and deep one distad of the rest on the edge of the postaxial side. Locality, the same.

Nearly entire length of a left femur of the same dimensions as the first of this series, notable for the small extent but great depth of the hollow space usually occupied by the pneumatic foramen. Locality, Malkuni. (Plate VIII., fig. 1 A. B.)

Nearly the whole length of a right femur, capitum and distal end imperfect, sculpture behind trochanter sharply defined, shorter but not less strong in the shaft than the first of the series. Locality, Lower Cooper.

Proximal five-sixths of a right femur. In this the neck is narrow, long, and unusually straight sided. The whole is apparently too much shorter than the other femurs to be confidently referred to *P. gregorii.* Locality, Malkuni.

Proximal five-sixths of a left femur, incapable of adding to our information. Locality, Malkuni.

Tibia.—Proximal half of a right tibia (Plate VI., figs. 4 A, B). This bone yields satisfactory evidence that those of the preceding ones, which appeared to be almost referrible to *P. carbo,* were not derived from that species, unless, indeed, further evidence should establish the fact that *P. carbo* was in existence in company with species now extinct.

From the figures given, it will be seen that in the present species the fibular crest or process (a) takes its origin much nearer to the proximal end than in *P. carbo,* is more incurved on its hinder edge, and consequently forms a deeper sulcus between it and the tibia proper. The anterior crest (b) is far less elongate. The whole articular surface is wider, although much shorter ; the anterior half of the double cavity (c) for the inner condyle of the femur is a circular and comparatively deep basin. Locality, Malkuni.

Distal five-sixths of a left tibia (Plate VI., figs. 5 A, B.). The fibular process does not extend so low distad as in *P. carbo*, and subsides gradually instead of ending quite abruptly and forming a hook at its distal end. The bridge over the extensor com. dig. tendon is stronger, but the outlet over which it arches is less spacious. The inner malleolus is narrower, the sides of the outer one parallel. Locality, Lower Cooper.

Distal two-thirds of a left tibia. This as far as it goes, has all the characters noted in the preceding. Of its specific identity with it there can be no doubt. Locality, Lower Cooper.

Distal fifth of a left tibia, with the same characters as the preceding. Locality, Malkuni.

Tarsometatarsus.—Distal two-fifths of a left one, wanting the fourth or outer trochlea. (Plate VI., fig. 6.) As commonly in these ancient birds, the ridging and grooving of the bone are accentuated. Witness the deep groove between the second and third metatarsals (D a.) of which there is scarcely a suggestion in *P. carbo*. The trochleas are comparatively small, the second especially so, when seen from the inferior surface of the foot. Locality, Malkuni.

Right metatarse nearly entire, but in bad condition, apparently from exposure before burial. Fortunately, the only part missing is a little of the distal end of the plantar process (Plate VIII., figs. 2 A, B, C.). The articular surfaces for the tibia, especially that for its inner condyle, are narrow and shallow (c). The inter-condylar process, compared with that of *P. carbo*, is pointed and subangular; the plantar process is comparatively thin, though not less extended in either direction, the tendo achillis passed through a complete tube (b). There is no distinct groove for the flexor profundus, the groove for the deep peroneus is broad and shallow; the trochleas are narrow and sharp edged; the shaft slender, though the bone, as a whole, is equal in length. Locality, Wurdulumankula.

Shaft of a left tarsometatarse, wanting the distal end and most of the proximal. Ridges of extensor anterior surface more developed than in the preceding. Locality, Malkuni.

Right tarsometatarse, wanting the distal end, tendo achillis groove tubular, extensor ridges well developed. Locality, Lower Cooper.

Left tarsometatarsal, wanting most of proximal end. Length, 64.5; breadth, 7 mm. Locality, Lower Cooper.

Right tarsometatarse, wanting the plantar process. Length, 61; breadth, 8 mm. Locality, Lower Cooper.

It is doubtful whether the last two bones belong to this species. If they do, this cormorant must have varied very much in size. The last especially has an unwontedly massive appearance.

Pelvis.—The middle and more solid part of a pelvis (Plate VI., figs. 3 A, B), comprising a portion of the foveæ iliacæ anteriores (fig. A a.), the acetabula (fig. A b.), and antitrochanters (fig. A c.); the iliac recess of the right side (Fig. B a.), three crural, the ischiadic sacral and post sacral vertebræ.

It would seem to be almost impossible to err in referring this pelvis to the genus of the Cormorants, so well characterised are they, and in distinguishing it from the pelvis of living species, even from that of *P. carbo*, with which in mere size it agrees best. Across the antitrochanters it measures 34 mm., that of *P. carbo*, 36.5 mm. On the dorsal surface, the neuropophysial ridge over the anterior iliac fovea is thin and sharp (fig. A.). There are no intervertebral foramina further forward than the hinder end of the antitrochanter, and what there are, are quite small; the antitrochanter is a large dice-box-shaped abutment, ending posteriorily in a broad, flat, semicircular area, to which there is a distant approach in *P. stictocephalus*, but not in *P. carbo*. On the ventral aspect the hypopophysial floor of the ischiadic vertebræ is transversely deeply concave, that of the sacral and postsacral vertebræ retains its breadth to a large extent as it approaches the caudal. Laterally, the antitrochanter is seen to be very broad, as is also the space between it and the inner edge of the obturator foramen. Locality, Lower Cooper.

From the same locality are a fragment with a right acetabulum and part of the antitrochanter, the ischiadic vertebræ and a portion of the anterior iliac fovea on both sides. A third small fragment has preserved only the acetabular region of the left side. Locality, Lower Cooper.

A fourth is the left side of the middle region of a pelvis with its acetabulum, and a fifth is merely the postsacral series of vertebræ.

From Mulcani, we have another mesial fragment with both acetabula, a similar example from Wurdulumankula, and the ischiadic vertebræ of a pelvis from Kalamurina.

PHALACROCORAX vetustus n.s.

The collection contains many bones of a Cormorant of smaller size and slighter build than *P. gregorii* or *P. carbo*, about intermediate between them and *P. stictocephalus*.

CORACOID.—Proximal three-fifths of a right coracoid, entire, except for a little damage to the acromion (Plate IX., figs. 1 A, B, C.). The unlikeness of this to the coracoid of *P. gregorii* is great. The large humeral facet is replaced by one of normal size, the scapular facet is similar to that of *P. carbo*, as is also the form of the acromium, while the shaft is vastly inferior in size. From *P. carbo* it further differs in the sharpness of all its features. Locality, Malkuni.

Proximal three-fifths of a second right coracoid, wanting most of the acromial process. This is so entirely alike to the other that it suggests nothing further which can be said about it. Locality, the same.

Distal three-fifths of a left coracoid wanting the external angle (Plate IX., fig. 2). The slenderness of the shaft differentiates this bone from *P. carbo*, the same character and the narrowness of its sternal facette (b) from *P. gregorii*. Locality, Kalamurina.

Humerus.—Proximal third of a left humerus (Plate VIII., figs. 3 A, B). In addition to greatly inferior size, the following differences from the humerus of *P. carbo* are noticeable in this bone: Both the superior and the inferior crests are less developed, and this proximal region of the bone is therefore proportionately narrower, the ridge ventrad of the latissimus dorsi is more pronounced, the surface on each side of it being hollower, and the arch over the pneumatic foramen is much lower. Locality, Malkuni.

Proximal half of a left humerus, damaged on both crests and on arch of pneumatic foramen, shaft a little stronger than that of the preceding example. Locality, Malkuni.

Proximal sixth of a left humerus, inferior crest and arch of pneumatic foramen destroyed. Locality, Malkuni.

Distal third of a left humerus, both condyles are short fore and aft, and the ulnar is narrow transversely (Plate VIII., fig. 4). The probrachialis insertion is broad, and almost interrupted. Locality, Kalamurina.

Distal fourth of a left humerus; except that the condyles are longer fore and aft, this presents no important difference from the preceding. Locality, Malkuni.

Distal third of a right humerus; the probrachialis insertion is scarcely interrupted, the condyles, which are slightly abraded, are small. The ridge from the distal end of the probrachialis insertion to the radial condyle is conspicuous. Locality, Kalamurina.

Distal five-sixths of a right humerus, the condyles of this are short fore and aft. The bone seems to have been much weathered before burial. Locality, Lower Cooper.

Ulna.—Proximal sixth of a right ulna (Plate IX., fig. 3), proportionate in size to that of the humerus. The end of the process rising towards the head of the radius turns suddenly dorsad from a sharp edge of division between it and the rest of the lip of the outer facet (fig. A a.), which is as hollow as that for the inner condyle of the humerus. These two facets are of equal breadth, and are separated by a short ridge. (fig. A b.), which is more sharply defined than in *P. carbo.* The olecranon is less developed. The groove for the lateral tendon immediately beyond the inferior edge of the bone is quite narrow, and the pointed space occupied by tendon distad of it (fig. A c.) is much more extensive. Locality, Malkuni.

Proximal half of a right ulna, wanting the olecranon and much weathered. Locality, Wurdumankula.

Carpometacarpus.—Plate IX., figs. 4 A, B.—Proximal two-fifths of a bone from the right wing. The shaft of the third metacarpal commences ridge-like, immediately distad of the conical process on the postaxial side of the head. This is the most obvious of the several means of distinguishing this bone from *P. carbo*. Size considerably less than in *P. gregorii*. Locality, Wurdumulankula.

Distal half of a left carpometacarpal (Plate IX., figs. 5 A, B). The junction of the third with the second metacarpal is much longer than in *P. carbo*. The distal articular surface is very similar to that of *P. carbo*, and in size it approaches very nearly to that of *P. gregorii*, to which, indeed, it might be referred, rather than to the present species. Locality, Lower Cooper.

Proximal end and part of the shaft of a left bone similar to the first. Locality, Malkuni. (Plate IX., figs. 7 A, B.)

Nearly complete bone of the right side, but minus the third metacarpal and with the distal articulation imperfect. This is a considerably smaller bone than the preceding, but on all other accounts cannot be separated from them. Locality, Lower Cooper.

FEMUR.—Plate VIII., figs. 5 A. B.—A right femur, entire but for the loss of a small part of the fibular facet of the outer condyle. Compared with the femurs of the larger cormorants, *P. carbo* and *P. gregorii*, the dimensions of this bone vindicate the belief that it belongs to a distinct species. In length, it is 51.5 mm., in the least breadth of its shaft, 5.3 mm.; in *P. gregorii* the length is 54.5 mm., the breadth, 6.5; in *P. carbo* the length is 58 mm., the breadth, 6.5 mm. The salient structural features of the bone are a thin, sharp, somewhat tortuous linea aspera (B a), and from the trochanter an extensor cruris ridge of the same character, a continuation of the ridge proximad in an oblique line on the shaft (B b), immediately proximad of the inner condyle, and the pit on the head for the interarticular ligament, as deep as in *P. carbo*—that is, much deeper than in *P. gregorii*. Locality, Malkuni.

A left femur, entire except for superficial injury to the head and condyles. The identification of this bone depends on size and proportions, which are very much the same as in the preceding case, but it is rather stouter in proportion to its length. Its ridges are not quite so pronounced, and the interarticular pit is shallower. Locality, Lower Cooper.

TIBIA.—Proximal half of a right tibia (Plate VIII., figs. 6 A, B, C), corresponding in size to the femur from Malkuni. Its inner crest (A a) is much deeper than in *P. carbo* or *P. gregorii*. The outer crest is much less expanded. As in *P. gregorii*, the articular surface viewed perpendicularly (C) is comparatively short, the crests being much less extended forwards. Locality, Malkuni.

Proximal third of a right tibia (fig. E.). Locality, Malkuni.

TARSOMETATARSUS.—Shaft of a left metatarse (Plate VIII., fig. 7). The proportions of this bone are the only means of determining its place to be in the present species. It is 55.5 mm in length, and 5.5 in least breadth, those of *P. gregorii* and *P. carbo*, 60 mm. in length, and 6 mm. in breadth. Locality, Lower Cooper.

Plate IX., fig. 6.—This is a coracoid unknown to the writer.

SUB-CLASS RATITÆ.

DROMAIUS patricius de Vis.

PELVIS.—The mesial vertebræ of a pelvis deprived of their neural arches and of almost all of their processes (Plate IX.). Remains of the last crural apophyses for junction with the ilium (a), and of the first sacral apophyses (b) are all that can be recognized. The first ischiadic apophysis forms, as occasionally in other birds, a junction with the last crural. The size of the fragment is, under these circumstances, the only guide towards a determination of its origin. A pelvis which in this part of it very much exceeds in size the corresponding part in the bulkiest of our carinate birds, the pelican for example, can only belong to one of the great flightless birds, the emu or cassowary to wit. So far as it shews, it might be either, but as no extinct cassowary is known as yet in Australia, it seems almost necessary to attribute the present fossil to the emu *D. patricius*. Locality, Wurduluman-kula.

Plate I

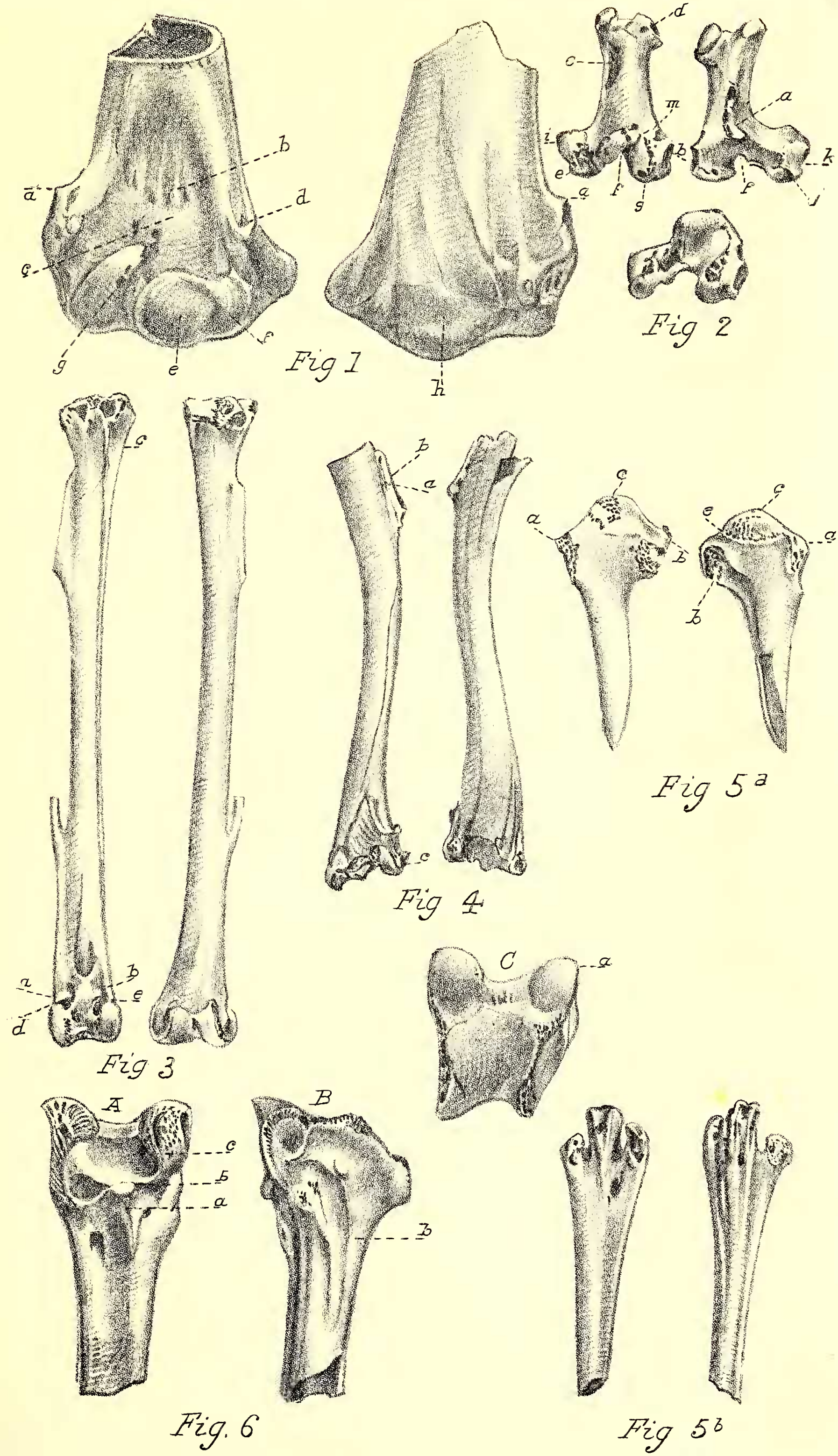


Fig 1

Fig 2

Fig 3

Fig 4

Fig 5a

Fig 5b

Fig. 6

Plate II

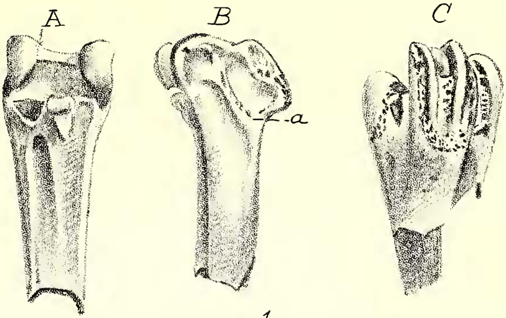


Fig 1

Fig 2

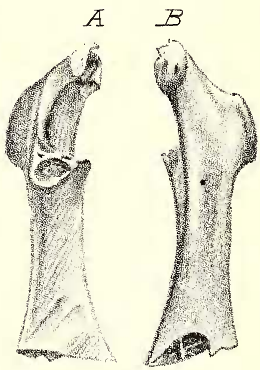


Fig 3

Fig 4

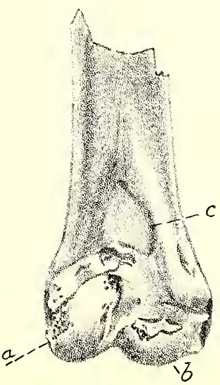


Fig 5

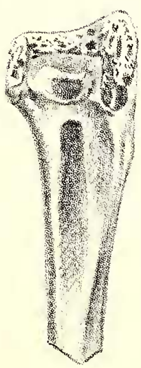
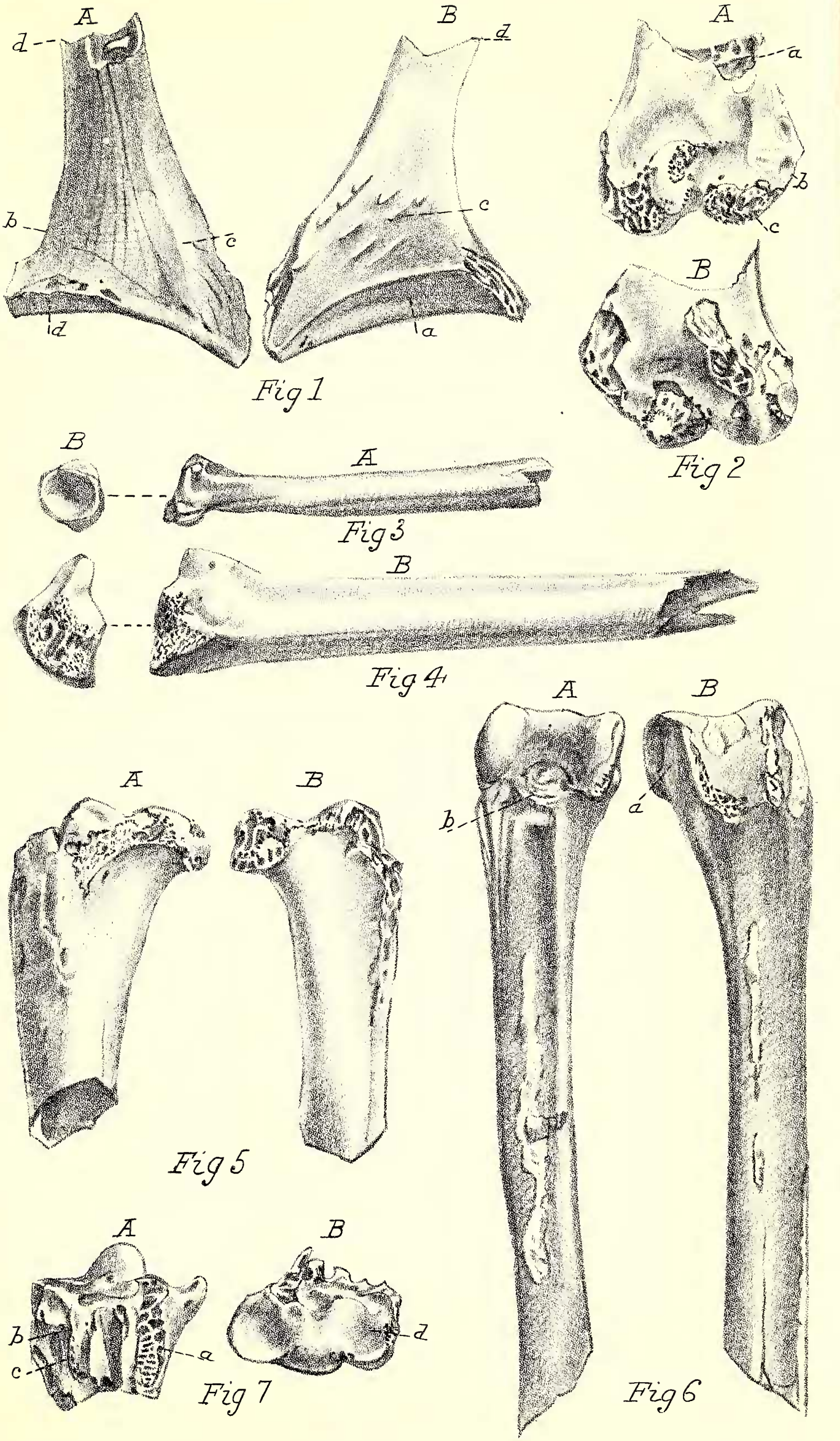


Fig 6

Fig 7

Plate III



A
B
d
d
b
c
c
d
a
Fig 1
A
a
b
c
B
Fig 2
B
A
Fig 3
B
Fig 4
A
B
A
B
b
d
Fig 5
A
B
b
a
c
d
Fig 7
Fig 6

Plate IV

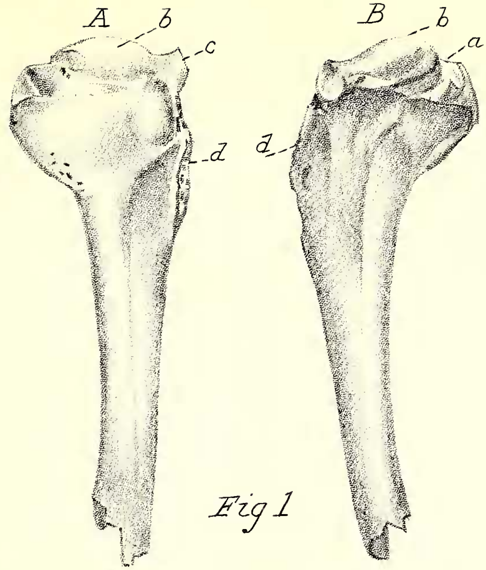
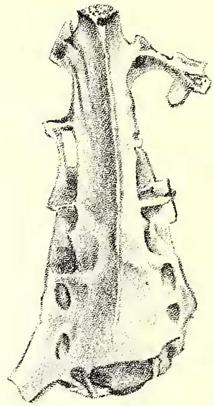


Fig 1



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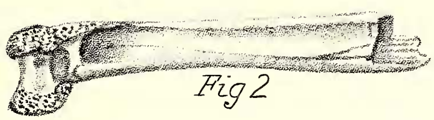

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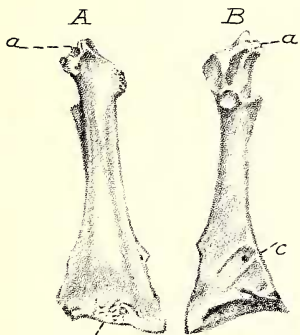

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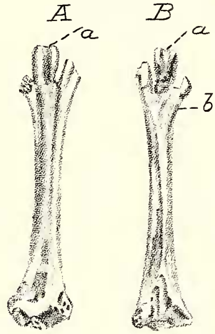

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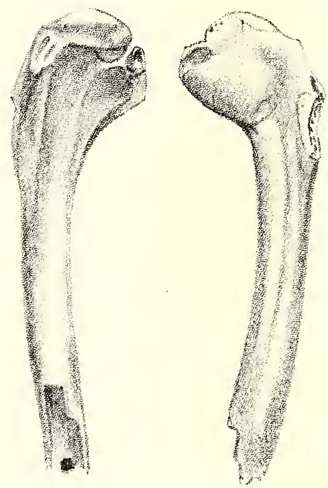


Fig 6

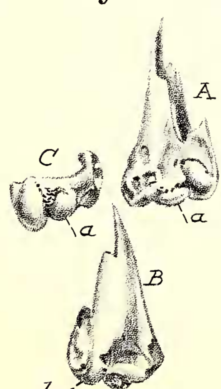


Fig 7

Fig 8

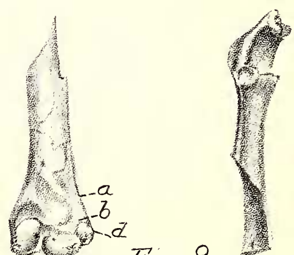


Fig 9

Plate V

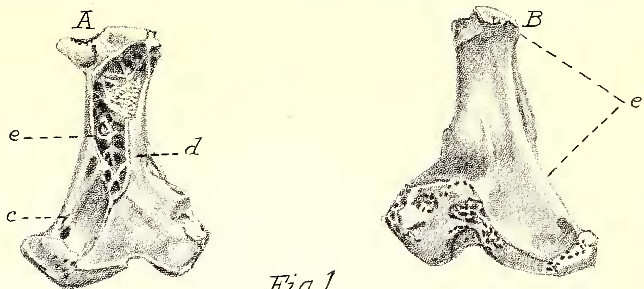


Fig 1

Fig 3

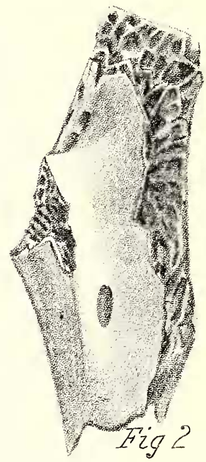


Fig 2

Fig 4

Fig 5

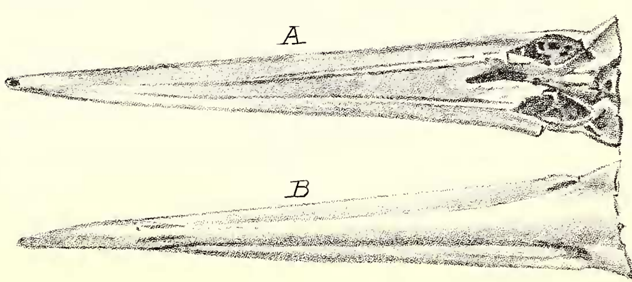


Fig 6

Plate VI

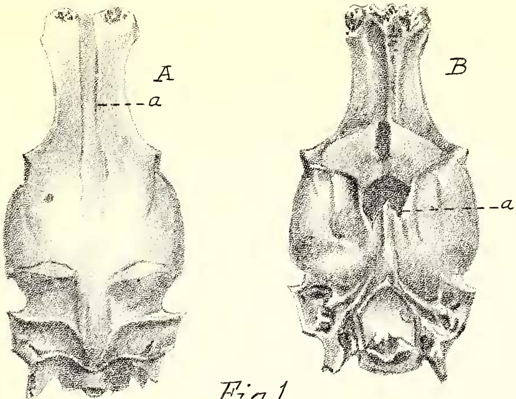
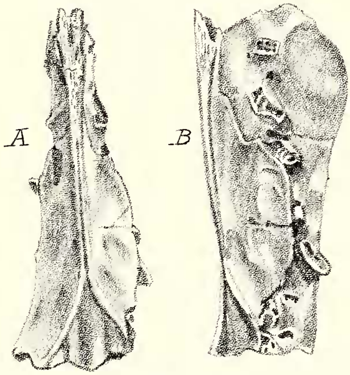


Fig 1



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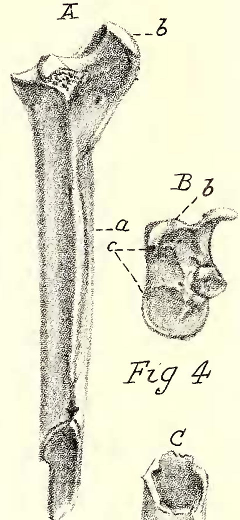

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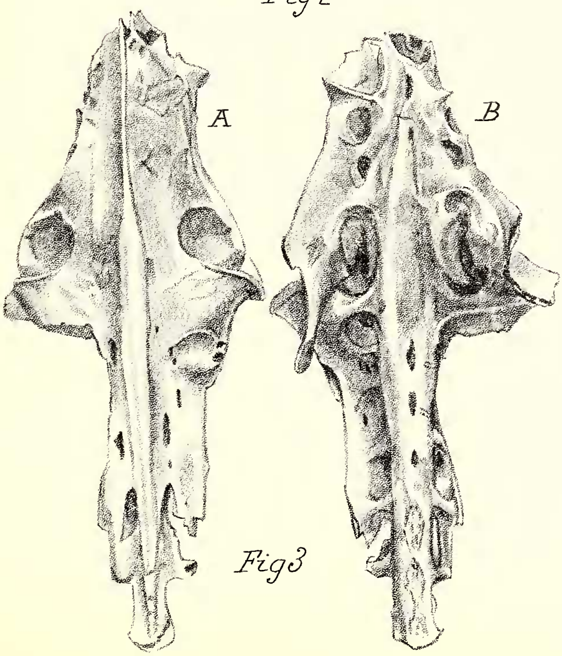


Fig3

Fig 6

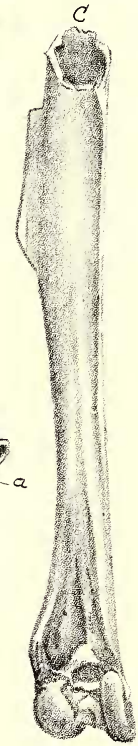


Fig 5

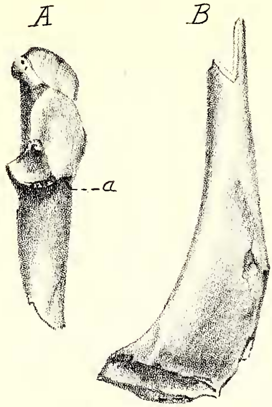
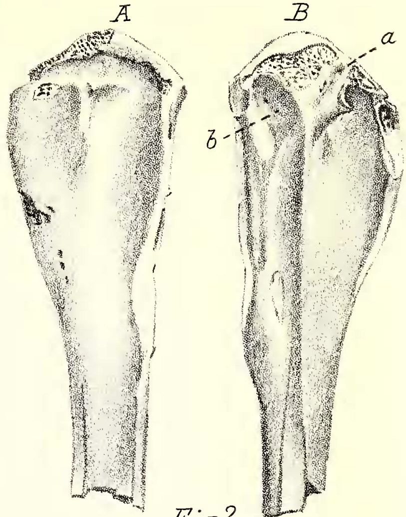


Fig 1



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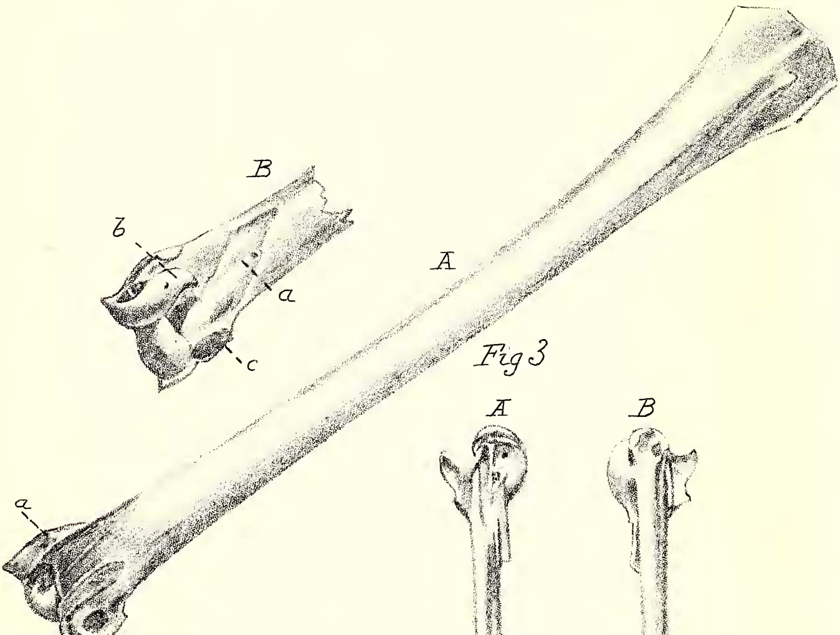


Fig 3

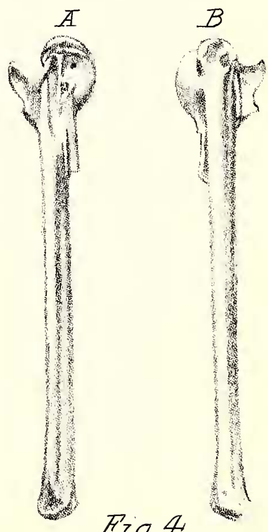


Fig 4

Plate VIII

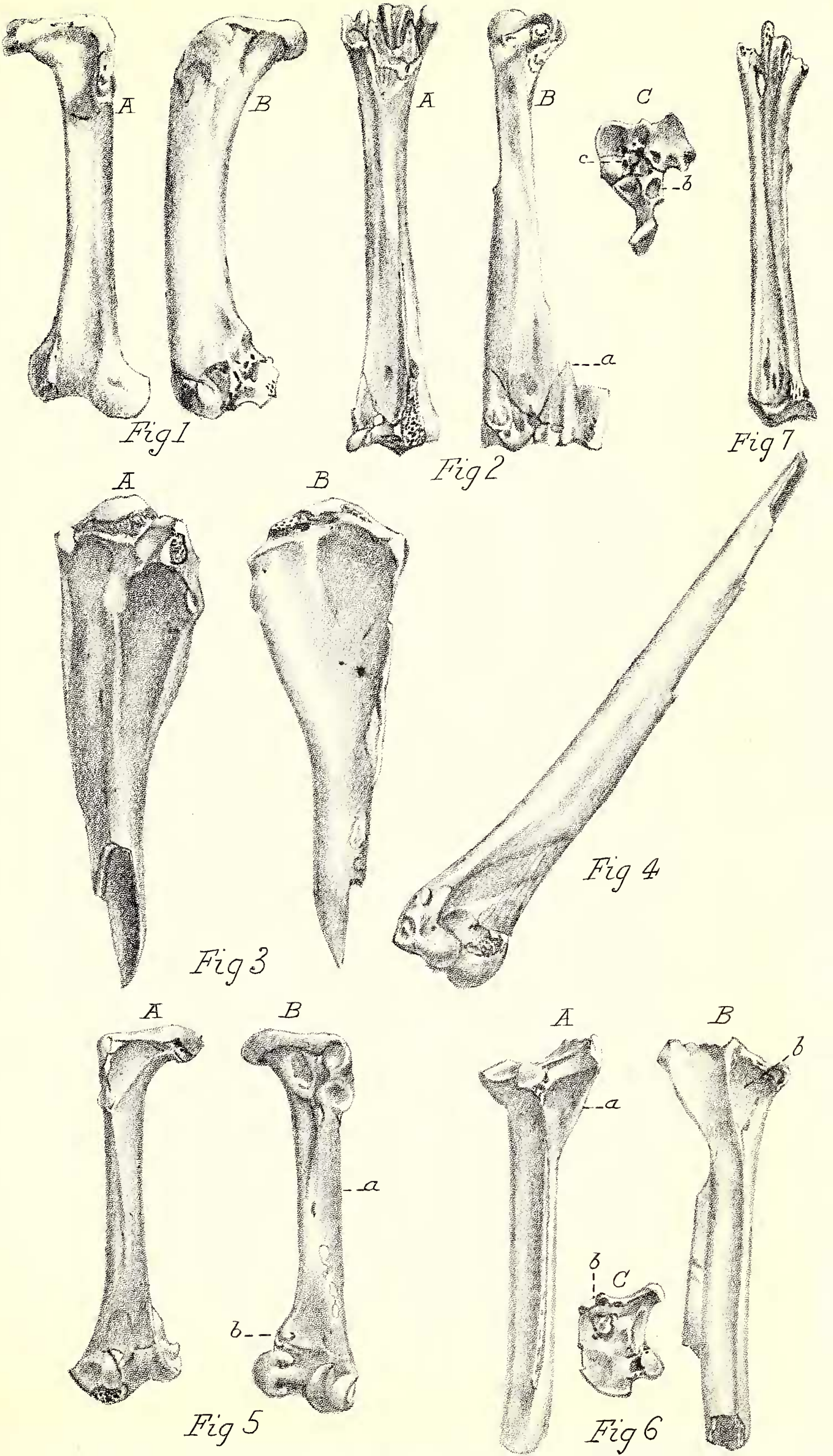


Plate IX

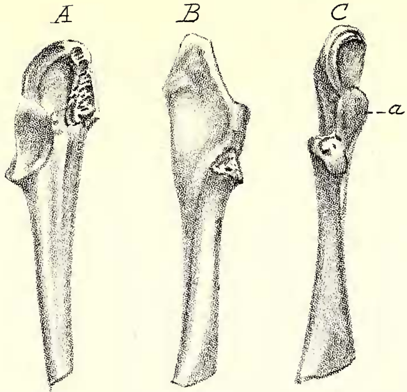
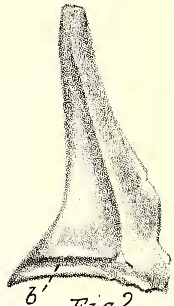


Fig 1



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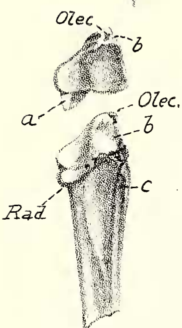

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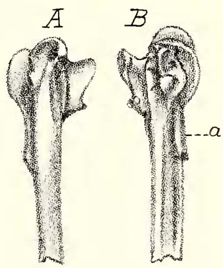

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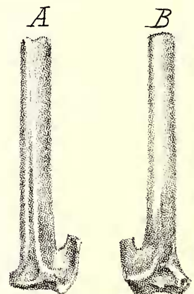

Fig 5

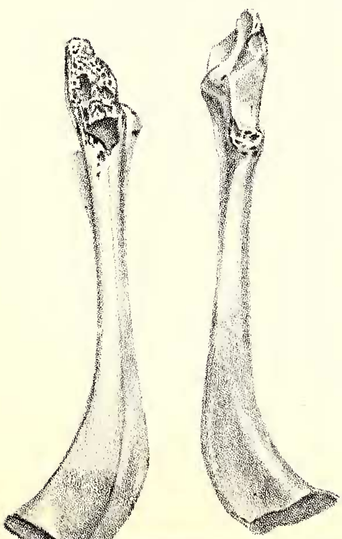

Fig 6

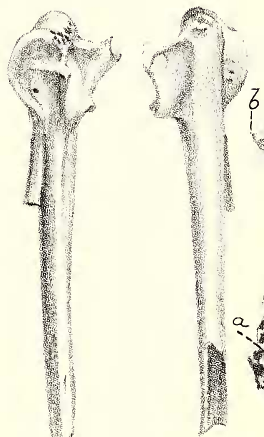

Fig 7

Fig 8